Value Management

- DOE 413 Requirements
- Implementation by MINERνA
  - What we did
  - How we documented it
- Summary

Value Management (VM). Value management is organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, quality, reliability and safety.

Like ES&H/QA, I think we do this all the time at FNAL, but, like ES&H/QA, we are not good at taking credit for it and documenting it – the key thing for DOE & Reviewers.

DOE 413.3 Requirements

CHAPTER VII - ADDITIONAL REQUIREMENTS – Paragraph 4

- DOE is committed to the use of value engineering to derive the lowest lifecycle cost of a capital asset.
- Value engineering yields the greatest cost savings when applied during the planning and design phases of a project.
- Value engineering should also be used during the construction phase of a project.

ATTACHMENT 1 - CONTRACTOR REQUIREMENTS DOCUMENT - PROJECT MANAGEMENT FOR THE ACQUISITION OF CAPITAL ASSETS – Paragraph 10

- A value engineering process must be used that identifies high-cost project activities in order to realize a maximum return on investment through the use of systems engineering tradeoffs and functional analyses that identify alternate means of achieving the same function at a lower life-cycle cost.

2.2.1 Critical Decisions – Page 2-5

All projects shall include a value management assessment.

- The assessment shall be conducted as part of the conceptual design process to include making a determination of whether a formal value engineering study is required.
- Any decision to not perform a formal value engineering study shall be documented in the Project Execution Plan.

DOE 413.3-1 Requirements

5.2.3 Systems Engineering And Value Management Planning – Page 5.4

Value Management

- The value management methodology, (also known as value analysis, value engineering, value planning, etc.) is a consideration in all capital asset acquisition process phases.
- Value Management is defined as an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, quality, reliability and safety.
- Value management is a technique directed toward analyzing the functions of an item or process to determine "best value," or the best relationship between worth and cost.
- The Value Management Program is an integral part of the overall project delivery process and is not a separate entity designed to "second-guess" the Integrated Project Team or design authority.
- The Department uses a two-tiered approach, as defined in the Federal Acquisition Regulation to implement a viable cost-effective value management program. The two approaches are the
  - "mandatory program" and the
  - "incentive" (also known as voluntary) program.

DOE 413.3-1 Mandatory vs. Incentive Program for VE

The minimum requirements consistent with the two approaches described in the Federal Acquisition Regulation, Part 48, are as follows.

Mandatory value management program:

- Used for all facility construction activities.
- Maximum benefit, if used as early as possible in the project development and design process so valid recommendations can be implemented without delaying the progress of the project or causing significant rework of completed designs.
- Value management uses a systematic procedure for analyzing requirements and translating these into the most economical means for providing essential functions without impairing essential performance, reliability, quality, maintainability, and safety. This organized effort is commonly referred to as the Value Methodology Standard.
- The Value Methodology Standard is the systematic application of recognized techniques which identify the functions of the product or service, establish the worth of those functions, and provide the necessary functions to meet the required performance at the lowest overall life-cycle cost.
- All mandatory studies conducted before Critical Decision-2 are accomplished using value management methodology.

DOE 413.3-1 Mandatory vs. Incentive Program for VE

Value management incentive program:

- Should be used in all contracts awarded on facility construction projects after Critical Decision-2, where the following contract conditions exist.
  - The Department or its agents have dictated the specifications, design, process, etc., that the contractor is to follow.
  - The contractor's cost reduction effort is not covered under award fee (or any other incentive).
  - The contracting officer has confidence in the cost estimate for the work at issue (i.e., confidence the cost estimate is close to normal Federal Acquisition Regulation pricing conditions).
  - The contracting officer has great confidence in the contractor's accounting system and/or can separately track costs of value management efforts based upon the contractor's assertions and confirmation from the Department cognizant chief financial officer.
  - The proposal, if accepted, requires a change to the contract and results in overall savings to the Department after implementation.

Additionally, it is the responsibility of the Department's Under Secretaries and their respective organizations to develop criteria and guidelines that conform to Public Law104-106, *National Defense Authorization Act for Fiscal Year 1996*, and OMB Circular A-131, for both in-house personnel and contractors that identify programs and projects with the most potential to yield savings from the application of value management techniques.

DOE 413.3 Summary

Value Engineering:

- Identifies high-cost project activities
- Derive the lowest lifecycle cost of the capital asset
  - Same function at a lower life-cycle cost
  - Using engineering tradeoffs and functional analyses
- Start applying at the planning and design phases of a project – greatest impact
- Continue through the construction phase of a project.
- All projects shall include a value management assessment.
  - Shall be conducted as part of the conceptual design process to determine if a formal value engineering study is required.
  - Any decision to not perform a formal value engineering study shall be documented in the Project Execution Plan.

What MINERνA has done so far

Value Engineering:

- Identifies high-cost project activities
  - Made a list of big ticket items/tasks for the project
- Derive the lowest lifecycle cost of the capital asset
  - Looked at what VE we had already done for these items
  - Documented what we had done for VE for these items (if it wasn't already written up in a semi-reviewable way)
  - Posted them in docdb in the category "Value Engineering"
  - We had covered everything already wrt VM, just not well documented
- Start applying at the planning and design phases of a project – greatest impact – we are doing this
- Continue through the construction phase of a project – we will continue

What MINERνA has done so far

Value Engineering:

- All projects shall include a value management assessment.
  - Shall be conducted as part of the conceptual design process to determine if a formal value engineering study is required.
    - This process we did on the previous slide showed that we had covered all our bases on big ticket items, but simply needed to get the documentation written and posted so one could easily find it
    - We determined that a formal value engineering study for a project our size (~$15M) was not cost effective and documented this in our preliminary Project Execution Plan.
  - Any decision to not perform a formal value engineering study shall be documented in the Project Execution Plan - done
    - So far no one has said we need a more formal VE Plan then what we have, but we have not gotten past CD-0 yet.

In addition:

- Written a document "Value Management on the MINERνA Project" to summarize our VM analyses to date and plans….

What MINERνA has done so far

"Value Management on the MINERνA Project"

- Re-iterates how DOE 413 defines Value Management
- States that for the MINERνA Project, the Value Methodology Standard includes:
  - Physics and engineering studies
  - Project and subsystem reviews to address technical, cost and schedule issues; and
  - Documentation of studies, presentations and reports.
- The MINERνA Project uses this standard in assessing the overall project and its various subsystems.
- DOE oversight of Value Engineering on the MINERνA Project is discussed in the MINERνA Project Execution Plan. (a paragraph)
- The methods in which Fermilab applies Value Engineering to the project is discussed in the MINERνA Project Management Plan. (a paragraph)
  - They have been used in preparing a conceptual design report and are being applied in the preparation of a technical design report.

    (There is a specific section in the CDR on VM)

What MINERνA has done so far

"Value Management on the MINERνA Project"

- Design review system, in which each major subsystem is closely examined to obtain optimal value for the system, given the technical requirements and schedule constraints imposed on it.
  - Reviews are documented in the project's document database
  - Documentation and updates are thus available to the project management staff, subsystem managers and other project personnel.
- Specific project notes on design modifications are maintained in an assigned Value Engineering category in the document database.
  - The database allows for easy access, review and updating by participants in the MINERνA Project.
- The following tables provide a snapshot of the Value Engineering notes as of December 2005. (we need to update this)

What MINERνA has done so far

"Value Management on the MINERνA Project"

MINERνA **doc #**	**Version**	**Title**	**Author**
8	1	Connector Mold Status	R. Flight, *et al.*
9	1	Reports on Steel and Wideband Assembly Space	J. Kilmer
18	1	OD Optimization	D. Naples
74	1	Y-7 and Y-11 Fiber Diameter	H. Budd
76	1	Move MINOS Power Supply	J. Kilmer
79	2	Justification for MINOS Magnet Power Supply Move	J. Kilmer
85	1	Revised Detector Parameters after Nuclear Target and OD Design Changes	K. McFarland
88	1	MINOS Near Detector Fringe Field Measurements	J. Kilmer
90	8	Trip and Trip-T Functionality	P. Rubinov
91	2	Justification for Dedicated Mill at Tufts	T. Mann
92	1	Steel Purchase Considerations	J. Kilmer
96	1	New Uniform Segment dwg	J. Kilmer
104	1	Preliminary Drawing of MINERνA in Cavern	J. Kilmer
128	1	Detector Cost/Optimization	K. McFarland
130	1	Detector Optimization Talk from JLab Meeting	D. Casper
199	1	OD Optimization	R. Ransome

What MINERνA has done so far

"Value Management on the MINERνA Project"

- Each WBS element at Level 2 of the project (9 of them) is assessed using the Value Methodology Standard.
- ASIDE: at the CD-1 Director's Review, each L2 had several bullets addressing VM for their sub-project (we will continue to do this at reviews)

EXAMPLE: WBS 5 – PMT Boxes

- Our Production Model is the MINOS experience with manufacture of MUX boxes by Tufts and Univ. of Indiana.
- PMT Box housing - uses construction-standard steel extrusion; very economical.
- Precision PMT holders and cookies - are fabricated completely in-house via a dedicated CNC triple-axis, tool-changer mill -- zero reliance on commercial vendors.
- We are striving for an optimized factory layout.

- (these are a bit rough, but you get the idea, they need to be cleaned up…)

MINERνA VM Summary

MINERνA:

- Documented in its Preliminary Project Execution Plan that it will not perform a formal value engineering study
- Made a list of big ticket items/tasks for the project
  - Look at what VE we had already done for these items
  - Documented what we had done for VE for these items (if it wasn't already written up in a semi-reviewable way)
  - Posted documents in docdb in the category "Value Engineering"
- Conducted a value management assessment top down with big ticket items and bottoms up by L2 managers.
- Wrote "Value Management on the MINERνA Project"
- Continues to apply VM through meetings, design reviews, physics analysis etc. and documents VM in docdb VM category
- Will periodically update our "VM on the MINERνA Project" document to ensure it accurately reflects what we have done to date on VM
- Hopes that this is enough for a ~$15M project